AH

Docket: 4929
Inv: Haruyo Fukui
et al.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-349815
(43)Date of publication of application : 21.12.2001

(51)Int.Cl. G01N 3/42
G01N 3/08

(21)Application number : 2000-170547
(22)Date of filing : 07.06.2000

(71)Applicant : BRIDGESTONE CORP
IAN MICHAEL HUTCHINGS
(72)Inventor : KUSANO YUKIHIRO
IAN MICHAEL HUTCHINGS

(54) METHOD AND INSTRUMENT FOR MEASUIRNG HARDNESS AND ELASTIC MODULUS OF THIN FILM

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a method and instrument for measuring the hardness and elastic modulus of a thin film, capable of accurately and precisely measuring a contact area by merely calculating work without generating a measuring error and capable of accurately evaluating the mechanical characteristics (harness and elastic modulus) of the thin film.
SOLUTION: In the method and apparatus for measuring the hardness and elastic modulus of the thin film, by pressing a pressure element to the thin film to be measured to change load quasi-statically, an x-value is calculated from a work Wt applied to the thin film of the pressure element at the loading time and a work W applied to the pressure element of the thin film at the unloading time by equation (3). $H/E=0.215-0.234x$ $(0\leq x\leq 0.8)$...(1) $=0.16-0.16x$ $(0.8\leq x\leq 1.0)$...(2) $x=(Wt-Wu)/Wt$...(3) $H=Pmax/A$...(4) $E=(\pi/2A)1/2dP/dh$...(5)Based on the x-value, H/E ratio is calculated from equation (1) or (2) and the contact area A is calculated from t H/E ratio and equations (4), (5) [where, H is hardness (Gpa) of the thin film, E is elastic modulus (Gpa) of the thin film, P is the maximum load (load at the maximum displacement), A is the contact area of the pressure element at the maximum load, h is the displacement of the pressure element (push-in depth) and dP/dh is the inclination of an unloading curve at the maximum load] and are substituted in the equations (4), (5) to calculate the hardness and elastic modulus of the thin film.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]